

Remarks

This Paper, Request for Continued Examination (RCE), and Declaration of Dr. Adel Sharif (hereafter *Sharif Declaration*) are submitted in response to the final Office Action dated May 24, 2010 with a shortened statutory response period ending on August 24, 2010. This Paper is filed within the shortened statutory response period. The Commissioner is hereby authorized to charge the RCE fee of \$810.00 and any additional fees to Deposit Account No. 23-2053.

1. Status of the Claims

Claims 42-61 are pending in this application. Claims 1-41 are canceled. New claims 59-61 are added. Support for the claims is found at p. 21 lines 9-24; p. 22 lines 21-31; p. 25 lines 20-32; p. 40 lines 11-27; p. 42 lines 23-27; and Figures 2-3.

In the Office Action dated October 8, 2009 (§4), the Examiner states that claim 42 includes the pressure limitation of “at least 7 MPa.” Claim 42 does not include this term. It appears that canceled claim 20 is being confused with pending claim 42.

2. The present claims are novel and nonobvious

Claims 42-55 and 57-58 are rejected under 35 U.S.C. §103(a) for allegedly being obvious over International Publication No. WO97/18166 to Herron et al. (*Herron166*) in view of U.S. Patent No. 4,781,837 to Lefebvre (*Lefebvre*), U.S. Patent No. 5,755,964 to Mickols (*Mickols*) and U.S. Patent No. 5,281,430 to Herron et al. (*Herron430*).

Claims 42-45 and 52-56 are rejected under 35 U.S.C. §103(a) for allegedly being obvious over U.S. Patent No. 5,098,575 to Yaeli (*Yaeli*) in view of *Mickols*, *Lefebvre*, and *Herron430*. Applicants respectfully disagree with and traverse these rejections for the reasons set forth below.

At the outset, the Examiner's statement that the second solution contains salts that cause fouling is not accurate. *See* Office Action dated May 24, 2010, p. 2. ("However, the second solution contains salts such as magnesium sulfate hydrated...which salt can if in contact with the membrane for certain time stick to the membrane and cause fouling."). First, the Examiner's position fails to consider the explicit claim language. The present claims explicitly recite that the second solution is "substantially free of components that cause membrane fouling." Second, the Examiner's position is contradicted by the specification which states that the second solution is made to be free of components that cause fouling. *See* present application, p. 41 lines 11-27. Third, the Examiner's position contradicts that of the skilled artisan who understands that fouling in the second solution only occurs due to ion crossover. *Sharif Declaration*, ¶10. Hydrated magnesium sulfate is very soluble in water (710g/l at 20°C), remains in solution, and does not stick to the membrane. *Sharif Declaration*, ¶6.

A. *Unexpected results*

The claimed process is a solution to a heretofore unidentified problem of crossover in a direct osmosis system. Crossover in direct osmosis occurs when dissolved species flow against the concentration gradient. *Sharif Declaration*, ¶ 4-7. None of the cited references recognize the phenomenon of crossover. *Sharif Declaration*, ¶ 4-8. The claimed process includes adding chemical additives directly to the second solution of a direct osmosis/nanofiltration system to prevent *in situ* fouling that occurs as a result of crossover. The addition of chemical additives directly to the second solution is an elegant solution to the problem of crossover—a problem not identified, not acknowledged, and not understood or remotely contemplated by any of the foregoing cited references.

B. *Herron166, Lefebvre, Mickols, and Yaeli fail to disclose/suggest adding antifouling/antiscaling agents*

As none of the cited references recognize the problem of crossover, it is no surprise that the Examiner admits that no combination of *Herron166*, *Lefebvre* and/or *Mickols* discloses or suggests adding antifouling/antiscaling agents to the second solution. Office Action dated

October 8, 2009, at p. 5 (“[t]he references discussed above lack the antifouling or antiscaling agents.”). In addition, *Yaeli* is also wholly silent regarding the addition of additives directly to the second solution as recited in the present claims. In an attempt to fill the deficiencies of *Herron166*, *Lefebvre*, *Mickols*, and/or *Yaeli*, the Examiner relies on *Herron430*.

C. Herron430 fails to disclose or suggest adding additives directly to the second solution

Herron430, however, fails to fulfill the deficiencies of *Herron166*, *Lefebvre*, *Mickols*, and/or *Yaeli* because *Herron430* does not disclose or suggest adding an additive directly to the second solution as recited in the present claims. The Examiner admits that the cleaning operation of *Herron430* does not disclose adding Ultrasil to an osmotic agent—that is *Herron430* does not disclose or suggest adding Ultrasil directly to the second solution. See Office Action dated October 8, 2009 at p. 5 (“The patent does not provide the agent in the osmotic solution”). To the contrary, the *Herron430* cleaning procedure requires the Ultrasil solution to be passed through the membrane pores. *Sharif Declaration*, ¶9.

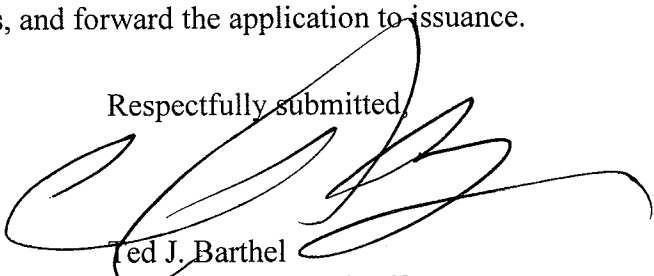
Moreover, the *Herron430* cleaning procedure is a stand-alone and independent operation. *Sharif Declaration*, ¶9. The Ultrasil cleaning procedure requires stopping the *Herron430* osmotic concentration procedure to clean the membrane. *Sharif Declaration*, ¶9. The skilled artisan would immediately recognize that the Ultrasil cleaning procedure is not all a step in the *Herron430* osmotic concentration procedure because the Ultrasil solution would negatively effect the taste of the *Herron430* concentrated beverage. *Sharif Declaration*, ¶9. To the contrary, the Ultrasil cleaning process is merely a stand-alone maintenance step—performed in isolation of osmosis. *Sharif Declaration*, ¶9.

Simply stated, no basis exists to conclude that a skilled artisan would interpret *Herron430* as adding an additive directly to the second solution of a direct osmosis/nano-filtration procedure as recited in the present claims. In view of the foregoing, it is only by way of improper hindsight that *Herron430* is being applied as a reference.

The Examiner is respectfully requested to reconsider the application in view of this Response, to withdraw the rejections, and forward the application to issuance.

Respectfully submitted,

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